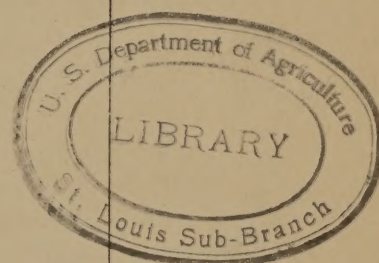


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RURAL ELECTRIFICATION

-its place in education

- I. New Horizons for Rural Education
- II. Areas of Study Where Rural Electrification May Be Included
 - A. Social Studies
 - 1. Economics
 - 2. Geography
 - 3. History
 - 4. Sociology
 - 5. Social Problems
 - B. Agriculture
 - C. Home Economics
 - D. Science
 - E. Cooperatives
 - F. Vocational Education
 - G. Adult Education
 - H. Safety Education
- III. Education -- Instructional Methods
- IV. Juvenile Books
- V. Informational Material Available Through REA



U. S. Department of Agriculture
Rural Electrification Administration
St. Louis, Mo.

[1943]

RURAL ELECTRIFICATION: ITS PLACE IN EDUCATION

I. New Horizons for Rural Education

Have you been out in the country recently? On a real, honest-to-goodness farm, that is, where people make their living from the soil?

A modern counterpart of the industrial revolution is sweeping rural America. Electricity has come to the farm, and the old rules of agricultural production, marketing, processing are giving way to new methods, new problems, new horizons of rural living.

Here lies a challenge for education: to articulate the change, to interpret it, and to provide intelligent leadership in this vast rural march of progress, to help lift rural America to new levels of living, work efficiency and physical and mental health.

"But, not so fast," you say. "Is this rural electrification a significant nation-wide movement or merely the gradual, sporadic diffusion of progress which can be seen in almost every phase of our national life?"

Judge for yourself.

As recently as 1935, only 744,000 farms -- less than 11 percent -- received central station electric service. Nearly 90 percent of the farms and 90 percent of the rural population still worked and lived in the era of the coal oil lamp and the wooden plow. Since then, however, electric power has been brought to 1,600,000 more farms, lifting the percentage of electrified farms to nearly 40. This has been accomplished in spite of the problems inherent in serving thinly populated areas. Today, government financed rural electric systems alone have a backlog of nearly 500,000 unfilled applications, and indications point to an overnight mushrooming in demand for further extension of rural electrification after the war.

During the same period, rapid advance has been made in the application of electricity to efficient farm production. Today there are more than 200 productive or labor saving uses for electricity on the farm. And science says this is only the beginning. Soil sterilization, insect control, air conditioning, fumigation by light, telephone communication over power lines -- these are only a few of the new applications of electricity which appear to lie just ahead.

Rural electric service is being achieved largely within the framework of private industry: by privately financed utilities and by locally-owned cooperatives financed through the government's Rural Electrification

Administration, created in 1935. The REA examines plans for proposed systems, makes loans where such systems are feasible, then provides technical advice and assistance to the new system during construction and later operation. The rural electric system, in turn, repays its loan with interest over a 25-year period. Most of the REA borrowers are cooperatives, owned and controlled by the farmer-members they serve. Altogether 805 government-financed rural electric systems are operating in 46 states and serving 1,046,000 consumers, most of them farmers.

Electricity is making these farmers more efficient producers. Just one kilowatt-hour -- about five cents worth of electricity -- does the work of a strong man toiling an entire day.

And electricity works in many different ways. It milks cows, separates cream, pumps water, grinds feed, saws wood, shells corn, operates shop tools, and furnishes belt power for light and heavy jobs. It is a baby chick's best foster mother, and through use of a home-made pig brooder, the means of saving on the average of one pig per litter. Electricity makes hens lay more eggs in the winter. It prevents spoilage, keeps milk, cream, eggs, vegetables and other produce fresh for market. Farmers are discovering that all this adds up to more efficient production, increased output and higher profits.

The farm family, for the first time, is beginning to enjoy the comforts of city living -- electric lights, a radio with no battery to run down, a range which is independent of woodbox or ashpan, modern household refrigeration. The farm homemaker has an electric washer, an iron and all the small appliances which make her more efficient and help to banish drudgery from the daily routine. Most important of all from the standpoint of both health and comfort, the family on the electrified farm can have running water and a modern bathroom.

Many of the present benefits of rural electrification now felt by the farm family are reflected on a larger scale to the rural community as a whole. For the first time modernly equipped rural schools, churches and community centers are possible. Local industries which have struggled along with inefficient and inadequate power may be modernized and expanded with electric power. With power available, other new industries may be attracted to rural areas where labor and raw materials are near at hand. Frequently communities develop their own industries out of food processing or handicraft activities begun at community centers. These provide a new bond of unity and a new source of income for the entire community.

These are only highlights of the far-reaching changes even now taking place in rural America as the result of the advance of electric power, but they are enough to indicate the direction of the trend and to suggest the scope of education's role. Already there are signs that education senses the proportions of the change taking place and is beginning to adjust its approach and its curricula to meet the changing needs of rural youth.

Increasingly, leaders in education are asking how they can best interpret the transformation within the framework of present day education. They are looking for practical means of speeding the technical, economic and social adjustments to the new and challenging aspects of 20th Century agriculture and rural living.

The outline which follows does not pretend to have all the answers. It is hoped, however, that its suggestions as to how rural electrification may be treated within the various areas of study, particularly in the elementary and secondary levels, will prove practical and helpful.

A. II. Areas of Study Where Rural Electrification May Be Included

Social Studies

1. Economics

Within the area of study of economics, rural electrification has at least three broad fields of contact.

Economic history cannot afford to overlook the significance of the application of electric power to agricultural production any more than in the past it could overlook the significance of steam and electric power to manufacturing. The productive influence of electricity on many farms of America has been particularly important during the war period, and its influence may be expected to expand still further in the immediate post-war era when world-wide demand for our agricultural products will probably reach its peak. The rural electrification program has also marked both the entrance of government in the field of high fixed capital investment and a new method of utility financing.

Within the province of economic research is the study as to the effects of the unbalance between assembly-line industry and woodenplow agriculture. Such a study should also throw light on the broad economic results which we may expect as American agriculture catches up with industrial production techniques and the farmer receives a larger share of the national income.

Answers to many practical questions posed by rural electrification lie within the province of the agricultural economist whose function it is also to re-emphasize and re-state old propositions to fit new circumstances. Certainly the young farmer should be more aware of the importance of keeping down production costs -- hidden costs as well as the out-of-pocket expenses of which he is conscious. Only such an understanding can pave the way for the most efficient application of electricity to farm production all along the line and a reduction of marginal producers.

As more farms are electrified and technical advances continue, farmers will have a right to ask and expect answers for new and intensely practical questions: "How much and what electric equipment can I invest in and use profitably?" "Should I farm more intensively by adding electric equipment to increase production, or should I farm more extensively by increasing the area of my operations with the equipment I have now?" "Which products should I process and refrigerate on my own farm by means of electricity and which should I market through the usual channels?" "Will it pay to operate a cold storage plant for more advantageous marketing?" "Should I use electricity to maintain normal production with less labor, or should I increase production by using electricity with normal labor help?"

Finally, electricity brings a larger degree of self-sufficiency within the reach of the farmer or increased efficiency in specialization. Which is the economically sound choice for the individual farmer and for our national economy? Such broad questions, others like them and others growing from them, are the responsibility of the economist and the economist-educator.

2. Geography

Since the application of electricity to agriculture, the availability of electric power -- once a geographic factor affecting industry alone - now also affects the extent and direction of agricultural development, the standards of living and the efficiency of great segments of rural population, and the existing patterns of rural production, marketing, processing and employment.

Of overall significance from the point of view of the economic geographer is the fact that electricity has made the farmer a more efficient producer, placing modern agriculture more nearly on a par with electrified modern industry. At the same time, electrification has increased the trend toward diversification with emphasis on production of meat, milk, eggs and poultry. Efficient farm processing and storage of perishable foods, possible only with electric cooling and refrigeration, enables more farms to produce and market milk, butter, fresh eggs, dressed poultry and fresh fruits and vegetables. Thus the diet of the nation is improved.

The availability of electric power in rural areas has also helped, for the first time, to bring about the establishment of small rural industries which provide local markets for agricultural products and surplus labor. Such local industries lay the foundation for greater economic stability in the rural community.

Improved standards of rural living and relief from farm drudgery, both of which follow rural electrification, have reduced the movement from farm to urban centers, contributing to the stabilization of agriculture.

3. History

Modern history deals less with dates, political contests and world battles than with sweeping changes in national attitudes and the development of peace-time forces which bring progress.

The development of rural electrification, first as an emergency measure on the part of the government to provide a self-liquidating program of public works, and later to extend the practical benefits of 20th Century power to agriculture, is indicative of the post-depression approach to broad economic and social problems through government. Electrification of rural America is itself a significant historical process which can be compared to the coming of the railroads and invention of the reaper in its stimulus to agricultural development.

Equally noteworthy is the fact that progress in rural electrification has been accomplished without stepping outside the limits of the citizen ownership and local control. Although the rural electrification program is spearheaded by a government agency, privately-financed utilities have electrified some areas while in others government-financed, but locally owned and managed cooperatives have provided electric service to farmers. The tremendous progress made in rural electrification since 1935 has been accomplished in about equal proportions by farmer owned electric cooperatives on one hand and by the private power companies on the other.

The development of electricity as an aid in food production, and particularly its role in maintaining war-time food output during the shortage of farm labor are part of the historically important facts surrounding World War II.

4. Sociology

As a new factor in rural life, farm electrification has social aspects and implications which offer a dynamic field for study and investigation within the area of sociology.

Social advantages march along with the growth of rural electrification. To the rural inhabitant, electricity brings city standards of living and good health; increased farm income; relief from physical drudgery; modern schools, churches and community centers; the establishment of rural industries. These combine to reduce the social pressures responsible for the flow of farm population to the cities.

These trends, strong in the pre-war period, may reasonably be expected to become even more marked after the war as the tempo of rural electrification increases.

To date, however, the broad effects of rural electrification have received little study. To what extent will rural electrification stabilize farm population? What influence will the rural electric cooperative exert toward the integration and advancement of the rural community? Just how will more leisure time for rural people affect future social patterns? These are among the many questions suggesting new areas for significant research in the field of sociology.

5. Social Problems

Since, from the social point of view, rural electrification profoundly affects rural patterns of living, it becomes one of the significant elements for study in the field of Social Problems.

It is particularly within the province of Social Problems to point out and evaluate the effects of rural electrification on the rural community, effects such as: increased income from the application of electricity to production, more leisure for the farmer and the farm family, the possibilities for part-time employment in rural industries, the availability of modern home equipment and facilities, including running water and plumbing, the modernization of the physical plant of churches, schools and community centers. The cohesive effects of the rural electric cooperative is another new social force released by rural electrification in many communities and one to which attention should be given.

Once the collective effect of these influences upon the rural community has been evaluated, Social Problems can consider realistically the new questions raised by them. These include providing youth and adult education to meet the demands of new agricultural and homemaking techniques; setting up adequate social and recreational programs in communities where electricity has given rural people more leisure time; the development of community activities; an adequate program for building up improved sanitary facilities and increased income to further advance community health.

B. Agriculture

Agriculture has a new tool. In less than a decade, the proportion of electrified farms has jumped from 10 to nearly 40 per cent. Even more rapid growth is indicated for the post-war period. Therefore, if it is to be realistic and practical, the courses of study in agriculture must teach the young farmer how to use this newest tool, electricity, efficiently and safely.

Already there are some 325 known uses for electricity on the farm, and more than two-thirds of them are proven productive uses. Agricultural courses should list and explain many of them. They should teach principles, construction and operation of electric chick and pig brooders. They should tell how to select and use electric water warmers, indicate their cost of operation and the increased production which can be expected from their use. Practical agricultural courses should teach more about horsepower and speeds and lubrication as they relate to electric motors and high speed motor equipment. They should teach more about care of such equipment and its safe operation. Theirs also is the responsibility of explaining scientifically the effects of artificial light on poultry and livestock. And, particularly, agricultural courses should show the close relation between work efficiency and a farm correctly engineered from the standpoint of wiring and equipment arrangement.

If the forward impact of electricity is to be fully felt in agriculture, the educator must teach not only the method of using new techniques, but also the theory behind those techniques and their full economic implications. This responsibility will increase as the field of agricultural applications is broadened by technical advances in the use of ultra violet rays, electronics and other fields of applied electricity. Nor should the modern agricultural course fail to suggest the possibilities and methods of using electricity to improve living conditions and standards of health for the farm family.

For rural students, such information should of course be detailed and highly practical. But urban students should also be given an understanding of the role of electricity in agriculture, if only to provide the city dweller with an objective picture of farm production and farm living.

C. Home Economics

Use of electricity to save time and labor, to improve family health and nutrition, to make the home more comfortable and attractive and to increase the productivity of the household is largely a problem of education and practical instruction. Herein lies a great challenge to workers in the field of home economics.

Modern homemakers must know the fundamentals of electricity as well as have a working knowledge of the other scientific principles involved to assist in planning an adequate wiring layout, to provide for good lighting, to select equipment best adapted to family needs, to arrange it in the home, and finally, to use it fully and efficiently.

The application of electricity to food preparation, food processing, freezing, dehydration, canning and the grinding of whole grain cereals and flour offer rich fields for advanced study as well as new areas of teaching responsibility. At the same time, problems relating to the arrangement of electric equipment in the kitchen and the planning of bathrooms and laundry centers in homes which have never before had them should receive greater emphasis in home economics courses on secondary and college levels.

The effect of electricity on household management also presents many challenging problems for study. Already, with little application of scientific management, the rural homemaker, through the use of electric equipment, has greatly multiplied her own capacities and increased the value of her time. But the average homemaker does not yet know how to take full advantage of the hours saved by electric equipment. As research workers in the home economics field help her to build new patterns of home management based on the use of electric equipment, she will become still more efficient and correspondingly more independent of routine household tasks.

D. Science

Ten years ago it was enough for science courses in elementary and secondary schools to treat electricity purely as a detached scientific phenomenon.

But, today electricity is a working tool on a rapidly increasing number of farms and in rural homes. So in rural areas particularly, the study of electricity must take on a highly practical aspect if it is to meet the needs of the modern student.

Basic principles of electricity are still important, but they are only a beginning. The modern farm boy wants and needs to know how to handle electric equipment safely and efficiently, what constitutes safe wiring, how to figure the load on a given circuit, how to figure motor speeds and speeds of equipment, and a host of similar applications. Likewise the modern farm girl is interested in electrons and lines of magnetic force for the most part in so far as they prepare her for her own responsibilities in planning household wiring, selecting the proper electrical equipment for the home, and using it safely and efficiently.

As technical advance in farm and home applications continue, the science curricula will be challenged more and more to present these applications adequately to rural students living in the era of "electro-agriculture."

Courses in the general science field have a particularly good opportunity to shape their treatment of electricity so that it fits the needs of students in rural areas, although practical training in making minor electric repairs has in some cases been given successfully to children in the second and third grades of primary schools. Complete courses in practical farm and home electricity appear to be a realistic approach for any science department toward fitting its work to the everyday needs of its students.

On the higher levels of scientific education, interest should be stimulated in the new problems which are peculiar to rural electrification -- problems of generation and transmission to meet the needs of isolated areas, problems of application on the farm and in the home. Much of the rapidity of agriculture's technical advance will depend upon the attention and sustained interest of science in this field.

E. Cooperatives

The cooperative form of business enterprise stands side by side with other kinds of private enterprise in all major countries of the world except where totalitarian domination has throttled it. While cooperatives were known to exist in America even before the Civil War, their major development took place in the present century and their greatest progress occurred during the past ten years. At present, about 30,000 rural and urban American cooperatives of various types, with more than 10,000,000 members, are doing an annual business amounting to about \$3,000,000,000. Further rapid expansion after the war is indicated.

If the school children of today are to receive a well-rounded preparation for the effective exercise of their responsibilities as adults in the society of tomorrow, a study of cooperatives and their place in the economic life of the nation must be included in the curriculum. This is particularly important with regard to rural schools, since farm people are increasingly coming to rely on their own cooperative organizations in marketing

and processing of crops and in obtaining farm supplies and services of various kinds, including electric service.

Rural electric cooperatives represent just about the newest development in the field of cooperation in America. Despite this fact, there are already 800 of them, with about a million members situated in nearly every state and operating in more than one-half of the counties of the U. S. Post-war expansion of rural electrification will no doubt add several million more rural families to this cooperative membership.

Therefore, electric cooperatives need to be given consideration in connection with any study of cooperatives in the rural schools. The fate of these enterprises will soon rest in the hands of the rural youth of today who, as future members and joint owners, will need to understand cooperative principles, methods and practices in order to exercise their powers of control democratically and for their mutual benefit.

Since cooperatives offer an excellent example of the application of the democratic process in the economic field, the study and practice of cooperation can be assumed to provide useful training for effective citizenship in our democracy. There are many places in the curriculum where different aspects of cooperative enterprise can suitably be introduced and dealt with, not only in the field of social studies, but also in agriculture, arithmetic, English composition and commercial subjects. The National Education Association has issued several publications recommending the study of cooperatives in the public schools and containing suggestions for outlines of study.

F. Vocational Education

Rural electrification raises the vocational standards of agriculture and homemaking and opens up new occupations for rural youth.

Greater curricular emphasis is needed on training in the fundamentals of electricity in its application to farming and home economics. Farming is so rapidly becoming a technological business that farmers of tomorrow must be prepared to make full and practical use of the new tools and techniques released by scientific research in agriculture, electricity, chemistry and allied fields. The same applies to vocational training in homemaking, with equal emphasis on the need for skills and knowledge in using the new electric tools which are coming to be regarded as essential to efficient farm homemaking.

The rural electric cooperatives themselves provide a new and interesting field for vocational study. Today there are 800 REA-financed co-ops alone, each of which must have a qualified manager. Heretofore there has been little opportunity to get pre-work training in this field on any level. These cooperatives employ around 1,600 maintenance men skilled in electrical distribution work, 2,500 bookkeepers-stenographers and a large number of skilled and semi-skilled linemen's helpers.

Additional vocational opportunities are opened up as small rural industries are modernized or new ones established along electric highlines. In 1939, a survey revealed that REA-financed systems served more than 3,500 rural industrial and commercial consumers. By the end of 1941, the number had increased to 15,000 which represented 136 different types of industries. These included food processing plants, textile industries, woodworking plants, oil refineries, machine shops, paint and pigment manufacturing, Tung oil plants, cotton gins, cheese factories, apiaries, hatcheries and poultry farms, fruit and vegetable graders and washers, and seed cleaning, drying and packing.

This trend brings a variety of new vocational opportunities within the reach of rural youth. At the same time, each new industry provides new jobs requiring skills and knowledges increasing the overall need for vocational education in rural high schools.

G. Adult Education

The mechanization of agriculture, the technological advances made in rural electrification and related fields, and the problems presented by a complex and changing world demand more knowledge and skill on the part of rural people than ever before pointing up the need for a broader and more dynamic adult education program. Within this field, rural electrification can make an important contribution.

Farm men and farm women need more information on the application of electricity to farming and homemaking as well as its effects on the general economy of the family and community. While some good material has been prepared by state and government agencies and other groups on the use, care and repair of electrical equipment for the farm and home and the construction of certain types of homemade equipment, there is still a very urgent need for educational materials in this field -- materials written in popular style and designed especially for rural people. The aim should be to show not only the practical applications of electricity for increasing income but also the applications which go to make rural living richer, more comfortable and satisfying.

In addressing the men and women responsible for formulating and carrying out adult education programs, it should be kept in mind that rural electrification opens up a field for greatly increased use of such potent teaching aids as the radio, the moving picture, the film strip with synchronized sound, the electrically equipped shop and the modern demonstration kitchen.

H. Safety Education

Forty percent of America's farms are now electrified, and it is anticipated that this percentage will be rapidly increased in the post-war period.

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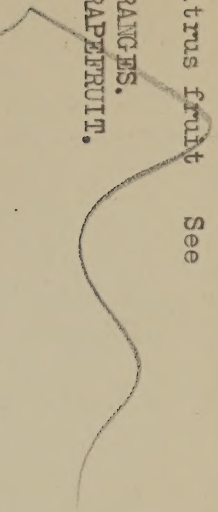
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With nearly $2\frac{1}{2}$ million farm families using electrical equipment daily, the fundamental principles of its safe use in the home, on the farm and in the community, to prevent accidents and eliminate fire hazards become an important part of the areas of safety study.

At the same time there is a need for greater emphasis on providing a working knowledge of the care and use of electrical equipment to keep it safe and serviceable. Emphasis also needs to be placed upon the teaching of safety skills, with close application to life situations.

Farm accident mortality leads all other types of industrial deaths. Each year 18,000 farm people are killed as a result of accidents: 3,500 die because of fires, which cost rural families \$225,000,000 annually. These and other facts point up the need for developing courses of study and curriculum materials that deal specifically in the techniques of farm and home accident prevention.

Searching out the formula for a functioning program in safety education is still a broad field for research and investigation. Much remains to be done by engineers in the design and construction of safe equipment for farm and household use. But this theme must be supplemented by more effective methods of teaching the safe use of the many machine age products which are finding their way into the daily lives of rural people at an undreamed of pace.

III. Education -- Instructional Methods

As electric service is extended to rural schools over the country, new educational approaches, new aids and techniques formerly limited to urban areas, may be brought into use in the vast field of rural education.

Rapid advances in the use of radio education has been made in recent years; still more rapid advances seem indicated by the development of practical television. Even the better programming on the part of commercial radio today, however, can be a significant factor in bringing the ideas, events and cultural offerings of the contemporary world to rural schools in isolated areas.

New techniques in the use of the moving picture, the film strip and the film strip synchronized with sound are being developed, not only by educators but by the armed forces and by business as a means of training men quickly. Many of these techniques will be adapted to the needs of the school room, with equipment designed to meet the requirements of the school.

In a word, the teacher who comes to the modern, electrified rural school will find new educational aids and equipment within her reach. Her professional training, if she is to work within maximum efficiency, must prepare her to use these new tools at her command most effectively.

IV. Juvenile Books

Authors of juvenile books have leaned heavily -- and rightly so -- upon the farm as a source of fresh, interesting and educational material. But only recently has the farm world taken on the added glamour of modern methods and scientific equipment.

Electricity as it is used on the farm and in the farm home today presents a colorful and appealing story, filled with adventure. The electric incubator has just as authentic a place in modern juvenile literature as the little red hen and her brood used to have a generation ago. Electric brooders to raise baby chicks and to save the lives of newborn pigs and lambs, electric pumps to provide water for the house, the barns, feed lots and pastures, electric milking machines, separators, coolers and refrigerators to process the milk and keep it free from harmful bacteria are subjects as inherently fascinating as the characters of a fairy tale. Stories about them, moreover, present facts that both rural and urban children should know.

The increasingly important role of electricity in the production of more food to meet the needs of this and other nations is a second phase of rural electrification in which boys and girls would be interested and of which they should be aware. Garden watering, the use of motors to run feed grinders, corn shellers and other farm equipment, and the place of farm freezing plants and dehydrators are among the many aspects of this subject which present striking possibilities.

Because children will be living more and more in a world where use of electricity is commonplace, the juvenile book can fill another important role by starting early to teach a wholesome respect for electricity and how to use it safely.

Tomorrow's boys and girls in rural communities will have the advantage of electric service. Certainly books written for use by these groups should reflect this new setting, in both factual and fictional discussions of rural life.

V. Informational Materials Available Through REA

REA can make available to educators, school groups, textbook publishers, writers and others excellent factual material on rural electrification, including graphs, charts, statistical studies and photographs, that pertains to these areas of study.